

number of grid points and in that the autocorrelation function of the grid decreases rapidly in all directions for values which are greater than said dot spacing.

10. (Twice Amended) The electrochromic display element according to Claim 1, characterized in that said pattern of strips or grid on the electrode or electrodes is deposited on the transparent, electrically conductive layer.

11. (Twice Amended) The electrochromic display element according to Claim 1, characterized in that the transparent, electrically conductive layer on the electrode is deposited on said pattern of strips or grid.

12. (Twice Amended) The electrochromic display element according to Claim 1, characterized in that said pattern of strips or grid of at least one electrode has a minimum mesh spacing of 3 mm.

13. (Twice Amended) The electrochromic display element according to Claim 1, characterized in that said pattern of strips or grid has a maximum optical density of 0.3.

Remarks / Arguments

Claims 1-13 are pending in the application, and have been amended. No new matter has been added.

The present invention relates to an electrochromic display element for large-scale electrochromic displays. It contains electrodes in the form of sheets, and at least one of the electrode sheets has a pattern of strips or grid made of a conductive material associated with it, as shown in Figures 1 and 2 of the application. The purpose of the conductive strips or grid is to produce a reasonably uniform potential across the electrode sheet when a potential difference is

applied across the display, thereby minimizing color variations and fluctuations when the display is in operation.

In the Official Action, claim 9 was rejected under §112, second paragraph, as being indefinite regarding the meaning of "spacing a". This claim has now been amended to eliminate the ambiguity by deleting "a" and referring to the dot spacing of a periodic grid.

Claims 1-3, 5-8, and 10-11 were rejected under §102(b) as being anticipated by Kato '716.

The Kato '716 reference does not anticipate the presently-claimed display. The reference discloses a prior art device in Fig. 1 and discusses this in column 1 of the specification. This device possesses display electrodes 2a, 2b, and 2c patterned in a desired figure or character, and bearing colored layers 3a, 3b, and 3c. Even assuming for purposes of discussion that the prior art display electrodes are "sheets" (which is not admitted), these electrodes do not possess a pattern of strips or a grid made of a material having metallic conductivity as presently claimed.

In his attempt to find a pattern of strips or grid, the examiner refers to column 3, lines 23-35 of the reference, and to find a transparent electrically conductive layer, he refers to column 5, lines 1-9. The portions of the reference specification referred to by the examiner deal with the invention claimed in the reference patent, which is a colored pixel display. In this display, the electrodes are strips, not sheets. The text on columns 3 and 5 referred to by the examiner relates to the process for producing the electrodes in a strip pattern. Figures 2, 3a, 3b, and 3c of the reference show clearly that the electrodes of Kato are themselves strips, not sheets, and that they do not possess the presently-claimed pattern of strips or grid.

The examiner refers to col. 4, lines 1-16 as teaching an electrochromic medium in the form of a solution, gel, or solid. The examiner is mistaken. The text referred to relates to the method of electrodepositing the dye on the electrodes.

The examiner refers to column 1, lines 10-29 as teaching the presently claimed electrochromic medium. This portion of the reference specification mentions an electrochromic

medium, but does not teach that it is a pair of redox substances which behave in the manner specified in claim 3.

Regarding claim 5, the examiner refers to col. 3, lines 23-35 as teaching that both electrode sheets have a periodic or aperiodic pattern of strips or grids made of a material having metallic conductivity. As explained above, this portion of the reference text relates to the method of producing the reference device. The electrodes are not sheets, and they do not have associated with them the presently-claimed pattern of strips or grid of conductive material.

Regarding claims 6 and 7, the examiner refers to col. 5, lines 1-9 as teaching that the lines in the pattern of strips of the two electrodes form an angle with one another. The examiner is again mistaken, as it is the electrodes themselves which are angled with respect to each other.

Regarding claim 8, the examiner refers to fig. 3a of the reference for the teaching that the periodicity of the pattern of strips or grid on at least one electrode is restricted to a very short distance. Again the examiner misses the point that the reference does not teach a pattern of strips or grid of conductive material on the electrodes. The reference shows electrodes which are themselves arranged in a pattern of strips.

Regarding claim 10, the examiner refers to col. 5, lines 1-9 for the teaching that the metal grid or pattern of strips on the electrode or electrodes is deposited on the transparent conductive layer. Regarding claim 11, the examiner refers to col. 5, lines 1-9 for the teaching that the transparent electrically conductive layer on the electrode or electrodes is deposited on the metal grid or pattern of strips. This portion of the reference text relates to the production of the color filter 8 on the display electrodes 7, and formation of the desired cell. It does not teach anything about formation of sheet electrodes having an associated pattern of strips or grid of conductive material.

In any case, dependent claims should be allowable once the independent claims to which they refer are found to be allowable.

In the official action, the examiner rejected claim 4 as being obvious over Kato '716 in view of Kasai '936. The examiner states that Kato does not teach the characteristics of the display element as in claim 1 (does the examiner mean to say claim 4?), but asserts that Kasai teaches these characteristics in detail. Claim 4 relates to various possible electrochromic media

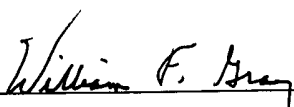
employing redox substances. The '936 reference relates to electrochromic materials in combination with solid electrolytes, and discloses a number of electrochromic materials (see col. 1, lines 33-41) and solid electrolytes. However, it does not appear that the properties of the reducible substances and oxidizable substances as recited in present claim 4 are taught in the reference, contrary to the examiner's assertion. The combination of the Kato and Kasai references does not disclose or suggest the presently-claimed invention.

The examiner states that claim 12 and 13 would be allowable if rewritten in independent form including all the limitation of the base claim and any intervening claims. As the examiner has failed to make out a proper rejection of the present claims on grounds of either anticipation or obviousness, his suggestion is not adopted.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned **"Version with markings to show changes made."**

In view of the above amendments and arguments, this application is deemed to be in condition for allowance, and allowance is accordingly requested.

Respectfully submitted,



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Version with markings to show changes made:

Claims 1-13 have been amended as shown below:

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TECHNICAL SERVICES
1. (Amended) [Electrochromic] An electrochromic display element containing an electrochromic medium between two electrode sheets, where at least one of the electrode sheets is transparent and has a transparent, electrically conductive layer, characterized in that the transparent electrode sheet or sheets has/have a periodic or aperiodic pattern of strips or grid made of a material having metallic conductivity.
 2. (Amended) [Electrochromic] The electrochromic display element according to Claim 1, characterized in that the electrochromic medium is a solution, a gel or a solid.
 3. (Amended) [Electrochromic] The electrochromic display element according to Claim 1 [and] or 2, characterized in that the electrochromic medium contains at least one pair of redox substances of which one is reducible and the other is oxidizable, where both are colourless or only slightly coloured and one substance is reduced and the other is oxidized on application of a voltage to the display element, with at least one becoming coloured, and after switching off the voltage the two original redox substances are formed again and the display element decolorizes.
 4. (Amended) [Electrochromic] The electrochromic display element according to Claim 3, characterized in that
 - a) the reducible substance has at least two chemically reversible reduction waves in the cyclic voltammogram and the oxidizable substance correspondingly has at least two chemically reversible oxidation waves, or

- b) the reducible substance and the oxidizable substance are covalently bound via a bridge [B], or
 - c) the reducible and/or oxidizable substances selected are ones in which the reversible transition between the oxidizable form and the reducible form or vice versa is associated with the breaking or the formation of a σ bond, or
 - d) the reducible substance and the oxidizable substance are metal salts or metal complexes of metals which exist in at least two oxidation states, or
 - e) the reducible and/or oxidizable substances are selected from the group consisting of oligomers and polymers which contain at least one of the redox systems mentioned or else pairs of such redox systems as are defined under a) to d), or
 - f) the reducible and/or oxidizable substances used as mixtures of the substances described in a) to e), provided that these mixtures contain at least one reducible and at least one oxidizable redox system.
5. (Twice Amended) [Electrochromic] The electrochromic display element according to Claim 1, characterized in that both electrode sheets have a periodic or aperiodic pattern of strips or grids made of a material having metallic conductivity.
6. (Amended) [Electrochromic] The electrochromic display element according to Claim 5, characterized in that the lines of the pattern of strips of the two electrodes form an angle with one another.
7. (Twice Amended) [Electrochromic] The electrochromic display element according to Claim 1, characterized in that the pattern of strips or grid made of the material having electrical conductivity is aperiodic on at least one electrode.

8. (Amended) [Electrochromic] The electrochromic display element according to Claim 7, characterized in that the periodicity of the pattern of strips or grid on at least one electrode is restricted to a very short distance.
9. (Twice Amended) [Electrochromic] The electrochromic display element according to Claim 7, characterized in that the arrangement of the aperiodic grid is such that the mean of the distance between two neighboring points of intersection of the grid, taken over all points of intersection of the grid, corresponds to the dot spacing [a] of a periodic dot grid having the same size and the same number of grid points and in that the autocorrelation function of the grid decreases rapidly in all directions for values which are greater than [a] said dot spacing.
10. (Twice Amended) [Electrochromic] The electrochromic display element according to Claim 1, characterized in that [the metal grid or] said pattern of strips or grid on the electrode or electrodes is deposited on the transparent, electrically conductive layer.
11. (Twice Amended) [Electrochromic] The electrochromic display element according to Claim 1, characterized in that the transparent, electrically conductive layer on the electrode is deposited on [the metal grid or] said pattern of strips or grid.
12. (Twice Amended) [Electrochromic] The electrochromic display element according to Claim 1, characterized in that [the grid or] said pattern of strips or grid of at least one electrode has a minimum mesh spacing of 3 mm.
13. (Twice Amended) [Electrochromic] The electrochromic display element according to Claim 1, characterized in that [the grid or] said pattern of strips or grid has a maximum optical density of 0.3.